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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/864,698	05/23/2001	David J. Corisis	3070.2US (96-1079.2)	1726

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EXAMINER

GRAYBILL, DAVID E

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 12/14/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/864,698

Examiner

David E Graybill

Applicant(s)

CORISIS ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

In the rejections infra, reference labels are generally recited only for the first recitation of identical claim language.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-10 and 13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee (5089878).

At column 3, line 1 to column 4, line 51; and column 6, lines 37-66, Lee teaches the following:

1. A semiconductor die assembly comprising: a semiconductor die 2 having a plurality of bond pads on an active surface thereof; a lead frame 8 having at least a first group of lead fingers 12 and a second group of lead fingers 12 to respectively extend from first and second opposing sides of said semiconductor die attached to a die-attach location 10 on said lead frame to another, single side of said lead frame in a substantially mutually parallel configuration; a first voltage reference plane 18b to overlie in immediate proximity to said first group of lead fingers and in electrical isolation therefrom; and a second

voltage reference plane 18b to overlie in immediate proximity to said second group of lead fingers and in electrical isolation therefrom.

3. The assembly of 1, wherein said first voltage reference plane and said second voltage reference plane are adhered to at least some of the lead fingers of said first group of lead fingers and said second group of lead fingers, respectively.

4. The assembly of 3, wherein said first voltage reference plane and said second voltage reference plane are adhered directly via a non-conductive adhesive 36 to said at least some of the lead fingers of said first group of lead fingers and said second group of lead fingers, respectively.

5. The assembly of 1, further comprising a packaging material 34 encapsulating at least said active surface of said semiconductor die.

6. The assembly of 5, wherein said packaging material at least partially covers said first and said second voltage reference planes and said first and said second groups of lead fingers.

7. The assembly of 1, wherein said lead frame includes a die-attach paddle 10 to which said semiconductor die is attached.

8. The assembly of 1, wherein said die-attach location comprises a die-attach paddle.

9. The assembly of 1, wherein said first voltage reference plane and said second voltage reference plane are electrically connected to at least one lead finger of said first group of lead fingers and said second group of lead fingers, respectively, which in turn is connected through a bond pad to a reference potential of said semiconductor die.

10. The assembly of 1, wherein at least one of said first voltage reference plane and said second voltage reference plane includes projections extending away from a direction of said immediate proximity of said first group of lead fingers and said second group of lead fingers, respectively.

13. The assembly of 1, wherein said first voltage reference plane and said second voltage reference plane are of sufficient mass to measurably alter heat transfer characteristics of said assembly.

14. The assembly of 1, further comprising a packaging material encapsulating said assembly so that only outer ends of said at least said first group of lead fingers and said second group of lead fingers extend therethrough.

15. The assembly of 1, wherein said first voltage reference plane and said second voltage reference plane extend over at least about fifty percent of a surface area of said at least

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said first group of lead fingers and said second group of lead fingers, respectively.

16. The assembly of 1, wherein said first voltage reference plane and said second voltage reference are separated from said at least said first group of lead fingers and said second group of lead fingers, respectively, by an insulating adhesive structure.

17. The assembly of 16, wherein said insulating adhesive structure comprises an insulating film 36 having an adhesive on opposing surfaces thereof, one surface of said opposing surfaces being adhered to at least one of said first group of lead fingers and said second group of lead fingers and another surface of said opposing surfaces being adhered to at least one of said first voltage reference plane and said second voltage reference plane.

To further clarify the teaching wherein at least one of said first voltage reference plane and said second voltage reference plane includes projections extending away from a direction of said immediate proximity of said first group of lead fingers and said second group of lead fingers, respectively, it is noted that the planes are three dimensional; therefore, they project in all directions; hence, they include projections extending in all directions, including away from a

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direction of the immediate proximity of the first group of lead fingers and the second group of lead fingers, respectively.

To further clarify the teaching wherein said first voltage reference plane and said second voltage reference plane are of sufficient mass to measurably alter heat transfer characteristics of said assembly, it is noted that this is an inherent property of the planes.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35

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U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee as applied to claim 1, and further in combination with Bozzini (5113200).

Lee does not appear to explicitly teach the following:

2. The assembly of 1, wherein said lead frame comprises a vertical surface mount package configuration.

Nevertheless, at column 3, lines 6-62, Bozzini teaches wherein a lead frame 10 comprises a vertical surface mount package configuration. Moreover, it would have been obvious to combine the product of Bozzini with the product of Lee because it would provide a lead frame.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee as applied to claims 1, 3-10 and 13-17, and further in combination with Higgins (5583377).

Lee does not appear to explicitly teach the following:

11. The assembly of 10, further comprising a packaging material extending over at least one of said first voltage reference plane and said second voltage reference plane, wherein said projections extend through said packaging material.

12. The assembly of 11, wherein said projections extend through said packaging material to an exterior surface thereof.

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Nonetheless, at column 5, lines 32-42; and column 9, lines 2-9, Higgins teaches a packaging material 42, 54 extending over a voltage reference plane, wherein projections extend through the packaging material to an exterior surface thereof. In addition, it would have been obvious to combine the product of Higgins with the product of Lee because it would facilitate heat dissipation.

Claims 18-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee (5089878) and Bozzini (5113240).

At column 3, lines 6-62, Bozzini teaches the following:

18. A vertical surface mount lead frame to be assembled to a semiconductor die, comprising: a lead frame 10 having at least a first group of lead fingers 12 and a second group of lead fingers 12 to respectively extend from first and second opposing sides of an intended die-attach location 15 to another, single side of said lead frame in a substantially mutually parallel configuration.

21. The assembly of 18, wherein said lead frame includes a die-attach paddle 15 to which said semiconductor die is attached.

22. The assembly of 18, wherein said die-attach location comprises a die-attach paddle.

However, Bozzini does not appear to explicitly teach a first voltage reference plane to overlie in immediate proximity said first group of lead fingers and in electrical isolation therefrom; and a second voltage reference plane to overlie in immediate proximity said second group of lead fingers and in electrical isolation therefrom, or the following:

19. The assembly of 18, wherein said first voltage reference plane and said second voltage reference plane are adhered to at least some of the lead fingers of said first group of lead fingers and said second group of lead fingers, respectively.

20. The assembly of 19, wherein said first voltage reference plane and said second voltage reference plane are adhered directly via a non-conductive adhesive to said at least some of the lead fingers of said first group of lead fingers and said second group of lead fingers, respectively.

23. The assembly of 18, wherein at least one of said first voltage reference plane and said second voltage reference plane includes projections extending away from a direction of said immediate proximity of said first group of lead fingers and said second group of lead fingers, respectively.

24. The assembly of 18, wherein said first voltage reference plane and said second voltage reference plane extend over at least about fifty percent of a surface area of said at least

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said first group of lead fingers and said second group of lead fingers, respectively.

25. The assembly of 18, wherein said first voltage reference plane and said second voltage reference is separated from said at least said first group of lead fingers and said second group of lead fingers, respectively, by an insulating adhesive structure.

26. The assembly of 25, wherein said insulating adhesive structure comprises an insulating film having an adhesive on opposing surfaces thereof, one surface of said opposing surfaces being adhered to at least one of said first group of lead fingers and said second group of lead fingers and another surface of said opposing surfaces being adhered to at least one of said first voltage reference plane and said second voltage reference plane.

Regardless, as cited supra, Lee teaches a first voltage reference plane to overlies in immediate proximity a first group of lead fingers and in electrical isolation therefrom; and a second voltage reference plane to overlies in immediate proximity a second group of lead fingers and in electrical isolation therefrom, wherein the first voltage reference plane and the second voltage reference plane are adhered to at least some of the lead fingers of the first group of lead fingers and the

second group of lead fingers, respectively, the first voltage reference plane and the second voltage reference plane are adhered directly via a non-conductive adhesive to the at least some of the lead fingers of the first group of lead fingers and the second group of lead fingers, respectively, the at least one of the first voltage reference plane and the second voltage reference plane includes projections extending away from a direction of the immediate proximity of the first group of lead fingers and the second group of lead fingers, respectively, the first voltage reference plane and the second voltage reference plane extend over at least about fifty percent of a surface area of the at least the first group of lead fingers and the second group of lead fingers, respectively, the first voltage reference plane and the second voltage reference is separated from the at least the first group of lead fingers and the second group of lead fingers, respectively, by an insulating adhesive structure, and the insulating adhesive structure comprises an insulating film having an adhesive on opposing surfaces thereof, one surface of the opposing surfaces being adhered to at least one of the first group of lead fingers and the second group of lead fingers and another surface of the opposing surfaces being adhered to at least one of the first voltage reference plane and the second voltage reference plane. Furthermore, it would have

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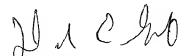
been obvious to combine the product of Lee with the product of Bozzini because it would reduce impedance.

The prior art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. In particular, 5305186 is cited primarily to show a projecting voltage plane similar to the product of the instant invention. The remaining prior art is applied to show products similar to the product of the instant invention.

Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to the group receptionist whose telephone number is 703-308-1782.

Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is 703/305-3431.



David E. Graybill
Primary Examiner
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